

## CLAIMS

The invention is claimed as follows:

1. A composition comprising a therapeutically effective amount of a plant material that is thermally processed and that includes one or more phytochemical agents capable of inhibiting at least one of enzymatic and transcriptional activity to prevent inflammation in a mammal.
2. The composition according to claim 1, wherein the plant material comprises an amount of at least 0.5% by weight.
3. The composition according to claim 1, wherein the plant material contains an effective amount of sesquiterpene lactones including an active fragment thereof that includes  $\alpha$ -methylene- $\gamma$ -butyrolactone.
4. The composition according to claim 1, wherein the plant material is derived from an *Asteraceae* plant family.
5. The composition according to claim 1, wherein the plant material is derived from a plant selected from the group consisting of coffee, soja, chicory, lettuce, extracts thereof, pulps thereof and combinations thereof.
6. The composition according to claim 1, wherein the plant material comprises a chicory extract.
7. The composition according to claims 1, wherein the plant material further includes a dietary agent selected from the group consisting of antioxidants, glucosamine, chondroitin sulphate, omega-3 fatty acids and combinations thereof.
8. The composition according to claims 1, wherein one or more of the phytochemical agents are capable of inhibiting at least one of enzymatic activity derived from cyclooxygenase and transcriptional activity derived from NF- $\kappa$ B.

9. The composition according to claim 1, wherein the composition is selected from the group consisting of a nutritional supplement, a nutritionally complete food product, a food preparation, a cereal product, a pet food, a pharmaceutical, a a  
5 functional food composition and combinations thereof.

10. The composition according to claim 1, wherein the plant material that is thermally processed includes an extruded plant material.

10 11. A composition comprising a therapeutically effective amount of a thermally processed plant material that includes one or more phytochemical agents capable of inhibiting at least one of enzymatic and transcriptional activity to treat inflammation in a mammal wherein the phytochemical agents include an effective amount of sesquiterpene lactones including an active fragment that includes  $\alpha$ -  
15 methylene- $\gamma$ -butyrolactone.

12. The composition according to claim 11, wherein the plant material comprises an amount of at least 0.5% by weight.

20 13. The composition according to claim 11, wherein the plant material is derived from a plant selected from the group consisting of an *Asteraceae* plant, coffee, soja, chicory, lettuce, extracts thereof, pulps thereof and combinations thereof.

14. The composition according to claim 11, wherein the plant material  
25 comprises a chicory extract.

15. The composition according to claims 11, wherein the plant material further includes a dietary agent selected from the group consisting of antioxidants, glucosamine, chondroitin sulphate, omega-3 fatty acids and combinations thereof.

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16. The composition according to claims 11, wherein one or more of the phytochemical agents are capable of inhibiting at least one of enzymatic activity derived from cyclooxygenase and transcriptional activity derived from NF- $\kappa$ B.

5 17. The composition according to claim 11, wherein the composition is selected from the group consisting of a nutritional supplement, a nutritionally complete food product, a food preparation, a cereal product, a pet food, a pharmaceutical, a functional food composition and combinations thereof.

10 18. The composition according to claim 11, wherein the thermally processed plant material includes an extruded plant material.

19. A composition comprising an active fragment derived from a thermally processed plant material, the active fragment including  $\alpha$ -methylene- $\gamma$ -butyrolactone  
15 wherein the active fragment in an effective amount is capable of inhibiting at least one of enzyme and transcriptional activity to prevent or reduce inflammation.

20. The composition according to claim 19, wherein the plant material is derived from a plant selected from the group consisting of an *Asteracae* plant, coffee,  
20 soja, chicory, lettuce, extracts thereof, pulps thereof and combinations thereof.

21. The composition according to claims 19, wherein the active fragment is capable of inhibiting at least one of enzymatic activity derived from cyclooxygenase and transcriptional activity derived from NF- $\kappa$ B.

25 22. The composition according to claim 19, wherein the composition is selected from the group consisting of a nutritional supplement, a nutritionally complete food product, a food preparation, a cereal product, a pet food, a pharmaceutical, a functional food composition and combinations thereof.

23. A pet food product comprising:  
a starch matrix; and  
a therapeutically effective amount of a thermally processed plant material comprising a phytochemical agent capable of inhibiting at least one of enzyme and transcriptional activity in a mammal to reduce risk of inflammation.

24. The pet food product of claim 23 wherein the thermally processed plant material contains an effective amount of sesquiterpene lactones including an active fragment thereof that includes  $\alpha$ -methylene- $\gamma$ -butyrolactone.

25. The pet food of claim 23 wherein the plant material is derived from a plant selected from the group consisting of an *Asteraceae* plant, coffee, soja, chicory, lettuce, extracts thereof, pulps thereof and combinations thereof.

26. A pet food product comprising a plant material that includes an effective amount of sesquiterpene lactones including an active fragment thereof that includes  $\alpha$ -methylene- $\gamma$ -butyrolactone derived from a thermally processed plant material selected from the group consisting of a plant associated with an *Asteraceae* plant, chicory, lettuce, coffee, soja, extracts thereof, pulps thereof, and combinations thereof in an effective amount to prevent or reduce inflammation.

27. A process for preparing a nutritional food product capable of reducing a risk of incidence of inflammation in a mammal, the process comprising the steps of:

providing a plant material;  
processing the plant material to form a plant extract including one or more phytochemical agents capable of inhibiting at least one enzyme activity and transcriptional activity in the mammal; and

processing the plant extract and one or more food ingredients to form the nutritional food product that includes at least 0.5% by weight of the plant extract.

28. The process of claim 27, wherein the plant material is thermally processed, to provide an effective amount of sesquiterpene lactones including an active fragment thereof that includes  $\alpha$ -methylene- $\gamma$ -butyrolactone.

5 29. The process of claim 27, wherein the plant material is extruded.

30. The process of claim 27, wherein the plant material is derived from a plant extract selected from the group consisting of an *Asteraceae* plant coffee, soja, chicory, lettuce, extracts thereof, pulps thereof and combinations thereof.

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31. The process of claim 27, wherein the plant extract is processed by defatting the plant material to form a first plant extract and subsequently processing the first plant extract with ethyl acetate via acid hydrolysis to form the plant extract.

15 32. The process of claim 27, wherein the plant extract further includes a dietary agent selected from the group consisting of antioxidants, glucosamine, omega-3 fatty acids and combinations thereof.

20 33. A method of reducing a risk of inflammation in a mammal at risk of inflammation, the method comprising administering to the mammal a thermally processed and therapeutically effective amount of a composition that contains a plant material including a phytochemical agent capable of inhibiting at least one of enzymatic and transcriptional activity in the mammal.

25 34. The method according to claims 33, wherein the plant material is derived from a plant selected from the group consisting of an *Asteraceae* plant, coffee, soja, chicory, lettuce, extracts thereof, pulps thereof and combinations thereof.

30 35. The method according to claim 33, wherein the phytochemical is capable of inhibiting at least one of enzymatic activity relating to cyclooxygenase and transcriptional activity related to NF- $\kappa$ B.

36. The method according to claim 33, wherein the plant material comprises a plant extract derived from chicory.

37. The method according to claim 33, wherein the the thermally processed  
5 plant material contains an effective amount of sesquiterpene lactones including an active fragment that includes  $\alpha$ -methylene- $\gamma$ -butyrolactone.

38. The method according to claim 33, wherein the composition comprises an amount of at least 0.5% by weight of the plant material that is thermally processed  
10 and contains an effective amount of sesquiterpene lactones including an active fragment that includes  $\alpha$ -methylene- $\gamma$ -butyrolactone.

39. A method for reducing a risk of osteoarthritis in a mammal at risk of osteoarthritis, the method comprising administering to the mammal a therapeutically  
15 effective amount of a composition including a thermally processed plant material that contains a phytochemical agent capable of inhibiting at least one of enzymatic and transcriptional activity in the mammal.

40. The method according to claims 39, wherein the plant material is  
20 derived from a plant selected from the group consisting of an *Asteraceae* plant, coffee, soja, chicory, lettuce, extracts thereof, pulps thereof and combinations thereof.

41. The method according to claim 39, wherein the phytochemical is capable of inhibiting at least one of enzymatic activity relating to cyclooxygenase and  
25 transcriptional activity related to NF- $\kappa$ B.

42. The method according to claim 39, wherein the plant material comprises a plant extract derived from chicory.

30 43. The method according to claim 39, wherein the thermally processed plant material contains an effective amount of sesquiterpene lactones including an active fragment that includes  $\alpha$ -methylene- $\gamma$ -butyrolactone.

44. The method according to claim 39, wherein the composition comprises an amount of at least 0.5% by weight of the plant material that is thermally processed and contains an effective amount of sesquiterpene lactones including an active fragment that includes  $\alpha$ -methylene- $\gamma$ -butyrolactone.

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45. A method for reducing a risk of an autoimmune disease in a mammal at risk of the autoimmune disease, the method comprising administering to the mammal a therapeutically effective amount of a composition including a thermally processed plant material that contains a phytochemical agent capable of inhibiting at least one of enzymatic and transcriptional activity in the mammal.

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46. The method according to claims 45, wherein the plant material is derived from a plant selected from the group consisting of an *Asteraceae* plant, coffee, soja, chicory, lettuce, extracts thereof, pulps thereof and combinations thereof.

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47. The method according to claim 45, wherein the phytochemical is capable of inhibiting at least one of enzymatic activity relating to cyclooxygenase and transcriptional activity related to NF- $\kappa$ B.

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48. The method according to claim 45, wherein the plant material comprises a plant extract derived from chicory.

49. The method according to claim 45, wherein the thermally processed plant material contains an effective amount of sesquiterpene lactones including an active fragment that includes  $\alpha$ -methylene- $\gamma$ -butyrolactone.

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50. The method according to claim 45, wherein the composition comprises an amount of at least 0.5% by weight of the plant material that is thermally processed and contains an effective amount of sesquiterpene lactones including an active fragment that includes  $\alpha$ -methylene- $\gamma$ -butyrolactone.

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51. A method for reducing a risk of cancer in a mammal at risk of cancer, the method comprising administering to the mammal a therapeutically effective amount of a composition including a thermally processed plant material that contains a phytochemical agent capable of inhibiting at least one of enzymatic and transcriptional activity in the mammal.

52. The method according to claim 51, wherein the plant material is derived from a plant selected from the group consisting of an *Asteraceae* plant, coffee, soja, chicory, lettuce, extracts thereof, pulps thereof and combinations thereof.

53. The method according to claim 51, wherein the phytochemical is capable of inhibiting at least one of enzymatic activity relating to cyclooxygenase and transcriptional activity related to NF- $\kappa$ B.

54. The method according to claim 51, wherein the plant material comprises a plant extract derived from chicory.

55. The method according to claim 51, wherein the thermally processed plant material contains an effective amount of sesquiterpene lactones including an active fragment that includes  $\alpha$ -methylene- $\gamma$ -butyrolactone.

56. The method according to claim 51, wherein the composition comprises an amount of at least 0.5% by weight of the plant material that is thermally processed and contains an effective amount of sesquiterpene lactones including an active fragment that includes  $\alpha$ -methylene- $\gamma$ -butyrolactone.

57. A method for inhibiting COX-2 activity in a mammal, the method comprising administering to the mammal a composition including a therapeutically effective amount of  $\alpha$ -methylene- $\gamma$ -butyrolactone.



58. The method according to claim 57 wherein the composition is capable of reducing at least one of a risk of inflammation, osteoarthritis, autoimmune disease and cancer in the mammal.

5 59. The method according to claim 57 wherein the composition is selected from the group consisting of a nutritional composition, a pharmaceutical and combinations thereof.

60. The method according to claim 57 wherein the composition includes an  
10 active fragment that includes  $\alpha$ -methylene- $\gamma$ -butyrolactone.

61. The method according to claim 57 wherein the active fragment is contained in a plant extract.

15 62. The method according to claim 57 wherein the plant extract is derived from a thermally processed plant material selected from the group consisting of an *Asteraceae* plant, coffee, soja, chicory, lettuce, extracts thereof, pulps thereof and combinations thereof.

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